AMERICAN STUDIES IN PAPYROLOGY

AMERICAN STUDIES IN PAPYROLOGY
VOLUME FOUR

# *THE TAXES IN GRAIN IN PTOLEMAIC EGYPT*

## *GRANARY RECEIPTS FROM DIOSPOLIS MAGNA*

*164-88 B.C.*

ZOLA M. PACKMAN

THE AMERICAN SOCIETY OF PAPYROLOGISTS
NEW HAVEN AND TORONTO • MCMLXVIII

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A GENEROUS GRANT FROM THE SKERRYVORE FOUNDATION

THE AMERICAN SOCIETY OF PAPYROLOGISTS
Box 1977 Yale Station, New Haven, Connecticut, U.S.A.
Office A 203 University College, Toronto, Canada

Set by the Society on VariTyper Garamond Font
Printed by Vernon Hunt, Incorporated, New Haven, Connecticut

## ACKNOWLEDGEMENTS

This study originated as a dissertation presented to the faculty of the graduate school of Yale University in partial fulfillment of the requirements for the degree of Doctor of Philosophy. I am indebted to professors J. F. Culham, Sophiah Lewis, and Alan F. Samuel for suggesting corrections and revisions that have been incorporated into this, as of now, second edition. For the production of both dissertation and monograph, I am particularly indebted to

Professor C. Bradford Welles, my teacher. His guidance and instruction form the foundation of whatever value my work may contain.

Mrs. Thelma F. Clark, my mother. She provided the support and encouragement without which I could have undertaken neither this work nor any part of my university career.

Dr. Paul M. Packman, my husband. Without his moral support and material aid, I might never have finished.

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# INTRODUCTION

## A. SCOPE OF THE STUDY

In this study, I propose to present a description and an analysis of a group of Ptolemaic documents. The documents are receipts issued from the granary of Diospolis Magna during the years 164-116 B.C. The analysis will be concerned with the significance of the phrases employed in these receipts to describe the taxes towards which the payments recorded on them were made; the description will be concerned with information given by the receipts, not individually, but as a group: Persons and functions of granary personnel, seasons of tax payments, and amounts paid for grain taxes.

All the receipts to be discussed here have been gathered from published collections of ostraka and papyri. Of the many papyrus receipts that have been published in such collections, a large proportion is concerned with various degrees of certainty to have come from the granary of Diospolis Magna. In this study, however, I have included only the receipts that bear the place of payment phrase, or, as we shall see, a variant of it. The provenance of these papyrus is certain, and the collection of information about them will provide a sounder basis for interpreting and recovering the Theban provenance ascribed to receipts that contain place name.

On the receipts that bear the place of payment phrase, or, as we shall see, a variant of it, there are a number of variables that might provide bases for distinct groupings. The name of the signatory, or that of the counter-signatory, the name of the taxpayer, the amount of grain paid, the year, or the month, or the day of payment. But one of the most interesting results of the study of these receipts is a better understanding of the number and nature of the various taxes or grain that were paid into the Ptolemaic granaries. There are a limited number of distinct phrases used on these receipts to describe the taxes towards which payments are recorded on the Diospolis Magna receipts, and I have chosen to make these tax-phrases the primary variable according to which I shall group and study the Diospolis Magna receipts. The names of officials and of taxpayers, the dates and amounts of payment—these variables will be studied in their application to groups of receipts bearing different tax-phrases, and a comparison between their occurrences in the different tax phrase groups will be used to assess the significance of the difference between the tax-phrases themselves.

This, then, will be the form of this study. In Part One material will be presented in eight Groups – one for each type of expression used on Diospolis Magna

receipts to describe the taxes towards which recorded payments were made. In each Group I shall list the published receipts that bear a single tax-phrase, along with the official signatures appended to these receipts, the formula in which the receipts are written, the amounts of payment recorded on them, the dates of payment recorded on them, and the names of the taxpayers written on them.

In Part Two, the material thus presented will be collated in six Sections. Under "Grain Officials" Section One I will try to describe the relationship between the two sorts of officials responsible for issuing grain receipts in Oxyrhynchus Magna. In Section Two I will trace general trends and individual variations in the formula of the receipts. In Section Three, I will compare the distributions and central tendencies of amounts recorded for payment of taxes on receipts bearing different tax-phrases. In Section Four, the distribution and central tendency of dates recorded for grain tax payment. The seasonal deviation of payments and their amounts, will be examined for implications bearing on the question of the Ptolemaic method of grain tax collection.

The nationality of taxpayers' names will be discussed in Section Five, in Section Six, "Grain Taxes", I will assess the significance of information presented in Sections One through Five for the meanings of the various tax-phrases recorded on Oxyrhynchus Magna grain tax receipts.

The research that led to this study began with questions raised by Dorothy J. Thompson's Deadline: Twelve [illegible] with the study of [illegible] dated 1 August [illegible] acknowledgments receipt of payment of wheat. The [illegible] view of the methods used in the Ptolemaic region to collect taxes in grain in one proposed by Rostovtzeff as long ago as [illegible] Under this system the village elements [illegible] taxes [illegible] as was [illegible] As Keller has pointed out, [illegible] apply to a particular [illegible] Magna was the scribe of the Sale Hall, which [illegible]

Examination of the [illegible] large number of grain tax receipts [illegible] Magna [illegible] perhaps [illegible] dated [illegible] August [illegible] Do these receipts [illegible] other characteristics that set them apart from those [illegible] the situation [illegible] and the change?

These questions [illegible] answers that can only be obtained from close reading of groups of documents. Much of the information available in

1 [illegible] Egypt." [illegible]

2 M. I. Rostovtzeff, "[illegible]," [illegible] 201.

the large numbers of published Ptolemaic documents will never be fully available to editors or historians, and groups of related documents are available in analytical collections. I choose to begin my researches with a study of granary receipts because these documents, by their brief and formulaic nature, offered limited numbers of variables for relatively simple analysis. Of the granary receipts published from Ptolemaic Egypt, I chose to study those bearing the name of the Dionysias granary because they formed a large group that observed, to a great extent, the unities of time and place.

The chief modern sources of data are, of course, the published collections of Ptolemaic ostraka; these collections are also the only scholarly works known to me that offer, in somewhat the same sense as this work of mine, some studies of the Dionysias Magna receipts. The receipts to be studied here were published in Wilcken's *Griechische Ostraka* (Leipzig, 1899); Meloni's *Ostraka Greci* (1953); Schubart's *Papyri und Ostraka der Papyrussammlung* (Vol. VII, 1922); Viereck's *Griechische Ostraka zu Strassburg* (1923); and Tait's *Greek Ostraca in the Bodleian Library*, Vols. I–II (1930).

All these works, as is Wilcken's great and pioneering study, that makes the greatest effort to compare, describe, and analyze the information presented by the documents published in its subsequent volumes of ostraka presents, in a general way, Wilcken's categories, such modifications as have been made, and additions made to Wilcken, supplementing, corroborating, or contradicting his remarks.

Thus Meloni, editor of the second group of receipts studied here, prefaces his collection of Greek receipts with the remark: "Also large collections of Greek ostraca must now be linked in the main as supplements to Wilcken's great publication." For Meloni, the chief value of his publication of ostraka is to be found "in the additional light which it may give upon the taxation of Egypt," and he accordingly groups his granary receipts, much as I have done in the first part of this study, according to the tax phrases they bear. Unlike me, however, he includes within his tax-phrase groups receipts that omit the placed-of-payment phrase (ἐν τῷ ὄντι τόπῳ, ἐν τῷ τόπῳ, etc.). Meloni provides at the beginning of each tax-phrase group of granary receipts a discussion of scholarly opinion regarding the meaning of the tax phrase involved, in these discussions he refers particularly to Wilcken's remarks and to those of Grenfell and Hunt in the first volume of *Fayum Papyri* (1900).

As Meloni himself indicates (*Ostraka Greci*, p. 70), the receipts preserved in his edition are only a selection of those available in his collection. Later, more inclusive publications of ostraka group the documents according to chronological or other principles. In Schubart's *Papyri und Ostraka*, granary receipts bearing the place-of-payment phrase (ἐν τῷ ὄντι τόπῳ, ἐν τῷ τόπῳ, etc.) are printed alongside all the others of Theban provenance without distinction based on tax-phrase. In Viereck's *Griechische Ostraka*, receipts bearing the place-of-payment phrase (ἐν τῷ ὄντι τόπῳ, ἐν τῷ τόπῳ, etc.) appear as a separate group including receipts without distinction based on tax-phrase. In Tait's *Greek Ostraca*, receipts from the Dionysias granary are published in chronological order, without distinctions based on place-of-payment or tax-phrase.

Tait seems to have had a remarkable grasp of the sense and significance of earlier-published documents parallel to those of his collection, and remarkable openness in the establishment of texts. His edition of the Bodleian papyrus is at once the most elegant and the most complete of the publications I have used. Tait provides no introductory remarks, neither to his publication as a whole, nor to his separate groups of documents. His prefaces to individual documents are few, and those few are more likely to describe the acquisition and appearance of a text than to argue even dates or the identification of individuals mentioned in his texts. Only once – in connection with [illegible] – have I found him to remark upon the potential of a document, and in that case he does not [illegible] the sense of the document as point for its relevance to a historical matter. And [illegible] and facts other [illegible], or implications [illegible] the Dorpolis Magna receipts.

[illegible] Tait who discovered – perhaps I should say [illegible] – that some [illegible] of the Dorpolis Magna formula [illegible] the last phrase of [illegible]. He [illegible] the only one that includes or begins with that last phrase [illegible] the other earlier published receipts [illegible] [illegible] either by Tait or [illegible] his example. Nonetheless [illegible] the readings [illegible] interpretations [illegible] And [illegible] (see the discussion of the last phrase in the Dorpolis Magna receipts below, p. [illegible])

Tait's [illegible] of the Dorpolis Magna texts [illegible] where corrections of the readings of published papyri are offered, are printed with the names of their [illegible] and whose arguments usually [illegible] Noel [illegible] [illegible] of Tait's readings printed in Dorpolis Magna III are [illegible] [illegible] (p. [illegible]), [illegible] with little [illegible] [illegible]

## B. STATISTICAL METHODS

It may have been obvious from the vocabulary in which I chose to express the purpose of Sections Three to Five of Part Two of this work (above, pp. [illegible]) that I intend to employ statistical techniques of description and interpretation of some of the information offered by the Dorpolis Magna receipts. It was not my purpose, in approaching the study of these documents, to design and execute exercises in statistics, on the contrary. I was at least prepared to attempt any such techniques more sophisticated than the calculation of arithmetic means and the construction of frequency charts. In the end, though, I felt compelled to locate and incorporate a few simple statistical tests, and that for three reasons.

In the first place, the receipts in our eight textpriest groups present numerical information, particularly in their dates and amounts, and the attempt to avoid statistical terms in describing them proved futile. Great numbers of such sentences

as, "The average size of wheat payments recorded on receipts of Group Four is rather larger than that of those on receipts of Groups One and Two, much larger than that of those on receipts of Groups Five and Seven, and very much smaller than that of those in Groups Three and Five" are intolerable – even in a technical study.

In the second place, information that presented is impossible to analyse. How great a difference between two groups in respect to their average size of wheat payments must we find before we can say that that difference is symbolic and not merely accidental? No amount of mere mathematical reasoning can provide the answer to that question, particularly when the number of receipts from which the two averages have been computed may be quite different.

The statistical tests and procedures I have used in examining this material are described in most elementary statistical textbooks. For my part, I find much of the books [illegible] a straightforward exposition of the mechanics of statistics. McGraw-Hill Book Company [illegible] for application and interpretation of specific tests. Sidney Siegel's [illegible] Nonparametric Statistics [illegible]

In order to [illegible] a series of numbers [illegible] to some measure of central tendency – the so-called average number that may be taken to represent the series. There are several [illegible] ways of describing the central tendency of a series of numbers. Mode, median and mean. The mode is the most common value of the set of values, whether [illegible] the class most frequently represented within the set. It is [illegible] the category of taxpayers' names as recorded on payment receipts as [illegible] Egyptian [illegible] determines the [illegible] with which names of these four nationalities appear. I shall [illegible] the mode of the Thompson Magna property receipts [illegible] the social class would be [illegible]

Suppose that a [illegible] consisted of three [illegible] For example, suppose that these numbers represent [illegible] of wheat payments – set of [illegible] receipts [illegible] It [illegible] such a number as a single [illegible] The mode [illegible] would be the [illegible] of [illegible] Of course the numbers are grouped in sets of five, the mode [illegible] would be that in including numbers 1 through 5.

The median of the set of values is the midpoint of the ranked [illegible] Let us [illegible] a midpoint requires [illegible] that a set of [illegible] be in [illegible] arrangement. The median value of taxpayers' [illegible] is [illegible] from one [illegible] to another. [illegible] However, I ranked the published Thompson Magna [illegible] receipts according to [illegible] dates, the [illegible] I would regard as median would be that [illegible] recorded and followed in point of time by equal numbers of receipts. The [illegible] set of numbers given above can be ranked according to increasing size, the median among them would be [illegible]

An arithmetic mean can be calculated neither for sets of nominal values (such as nationalities) nor for sets of ordinal values (such as progressive and

[illegible] only for mathematical values. Any [illegible] some objective scale – inches, pounds, miles, or, as in the examples of numbers given above, artists. The mean is computed by adding the values of a set of measurements and dividing that sum by the number of measurements in the set. The mean size of payments is most emphatically "proper." [illegible]

On [illegible] the number that [illegible] the central tendency of a set of values may differ depending on whether one uses mode, median, or mean – as our examples [illegible] "the median is the mean." [illegible] Differences between mode, median, and mean are [illegible] patterns of distribution within sets of numerical observations. The addition of one or two large numbers to a group of ten small ones, for instance, will affect the mean very [illegible] the median slightly, and the mode not at all. [illegible] from a simple measure of central tendency whether that measure [illegible] large numbers that include a few small ones, from a set of fairly small numbers that include a few much larger ones, or from equal numbers of larger and smaller numbers.

A comparison of mean and median [illegible] will give some indication of the distribution of the set. If mean and median are identical, the set includes equal proportions of larger and smaller numbers. If the median is greater than the mean, the set includes more larger than smaller numbers. If the mean is greater than the median, the set includes more smaller than larger numbers. Statisticians use the term "skew" to describe a distribution in which mean and median are identical; in any other case, the distribution is "skewed."

Statisticians have [illegible] ways of measuring the dispersions of sets of numbers, that is, the [illegible] of the values [illegible] from the mean. These methods, though [illegible] are applicable only to sets of numbers whose distribution is normal, and the distribution of [illegible] numbers to be considered in this study [illegible] normal.

In the first part of this study, where I describe the information presented by groups of Diaspora Magen donations, I have provided lists of numbers where numbers occur. In the case of amounts of gifts paid on basis, the information provided by the list of numbers of artists recorded will be supplemented by a calculated median and calculated mean. In the case of schedules of payments, I have grouped the dates within months of the Italian calendar and constructed therefrom charts displaying the frequency of payments within those months. The central tendency of dates of payment is best represented in terms of the modal month, usually June or July.

In the second part of this study, where I compare and analyze the information presented by groups of Diaspora Magen grantees receipts, further statistical procedures become necessary. The development of the probability theory has made it possible for statisticians to devise ways of assessing the significance of variation between the central tendencies or distributions of sets of observations. These procedures or "tests" determine the probability of obtaining any specific degree of variation by accident from separate samples of a single population. If the probability determined is, for example, 0.5 – five times in ten, on a

95 percent probability—the difference between the sets of observations is said to be insignificant, and the sets are then supposed to represent a single population. If, on the other hand, the probability obtained is [illegible] (as in the figure usually shown above) by the computer—the difference between the sets of observations is said to be significant, and the sets are then supposed to represent distinct populations.

Because the significance of variation in central tendencies between descriptive sets of observations depends not only on the degree of variation but also on the number of cases, and on the number of cases among which each set [illegible] the calculation of statistical [illegible] is [illegible].

A [illegible] statistic, [illegible] the significance of variation in central tendency is the chi-square. The chi-square test evaluates the differences in modal classes between two or more sets of observations, it can be used for sets of nominal as well as for sets of arithmetic [illegible].

Suppose that in two groups of Dorpian Men's prayers we find the proportions of [illegible] to Christian names among the baptisms each [illegible]. In group A [illegible] are Christian [illegible] and there whose names are Pagan; in group B there are those whose names are [illegible] and those whose names are Pagan. [illegible] suppose that [illegible] those whose names were [illegible] were [illegible] to make payments of the [illegible] in group A. Happens to make payments of the [illegible] in group B. Does the [illegible] of proportions [illegible] significant or accidental? [illegible] to the procedure of the chi-square test.

| | A | B | TOTALS ↓ |
|---|---|---|---|
| GREEK NAMES | [illegible] | [illegible] | [illegible] |
| HEBREW NAMES | [illegible] | [illegible] | [illegible] |
| TOTALS → | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

Recorded observations are placed in the upper left corner of each cell, in the lower, righthand corner here number 5 are the frequencies expected by chance in each cell, [illegible] the marginal totals. Note that [illegible] equals the proportion of the [illegible] to the total [illegible]. The difference between observed frequencies and expected frequencies in each cell is squared, the square is divided by the expected frequency in that cell, the numbers thus obtained for each cell are added, the sum is called the chi-square. The sum obtained may be located on a table of the values of chi-square[1] under the degrees of freedom allowed by the table from which it was computed. Degrees of freedom are equal to the number of rows less one, times the number of columns less one; in our example, the degrees of freedom are only one, and the probabilities of meaning

[1] Such a table will be found in almost any elementary textbook on statistics, or in a handbook of mathematical tables.

at one degree of freedom the chi-square value [illegible] by chance is greater than .05, but less than .1. There is thus less than one chance in ten that the difference between the proportions of Greek and Hospital names in each of these groups is accidental.

The chi-square test can be used to test the difference between the medians of several samples of numerical observations. In this case it may be called simply the median test. Suppose that we wish to test the hypothesis that the difference in median size of families in which [illegible] occurs in the groups of Hospital Magna [illegible] groups. [illegible] the amounts paid to the [illegible] between these [illegible] medians. We will construct the following chi-square table.

| | [illegible] MEDIAN | [illegible] MEDIAN | [illegible] |
|---|---|---|---|
| [illegible] | | | |
| [illegible] | | | |
| TOTAL | | | |

| | |
|---|---|
| | |
| | |

In each cell we will record, at the upper left, the number of observations that applies, as well as the [illegible]

Another test for the [illegible] between medians of several samples is called the Kruskal [illegible] test. It is more [illegible] than the chi-square median test [illegible] [illegible] the [illegible] Hospital [illegible] [illegible] To compute the Kruskal [illegible] we rank all observations from all samples [illegible] the smallest [illegible] the largest [illegible] the [illegible] of the difference between the [illegible] by the formula where N is the total number of observations in all sets, n is the number of observations in a single set, [illegible] the sum of the ranks in a single set.

$$\text{[illegible]} \left( \frac{[illegible]}{[illegible]} - \frac{[illegible]}{n} \right) \qquad \text{[illegible]}$$

The result obtained by the application of this formula can be evaluated by consulting a table of the values of chi-square using the degree of freedom the number of sets [illegible]

One [illegible] of the Kruskal [illegible] test is its [illegible] for analysis of three or more sets of observations, and [illegible] more than five observations each. [illegible] Table 1a.

The statistical tests designed to assess the significance of the difference between arithmetic means [illegible] observations [illegible] quite normal distributions of [illegible] [illegible] As I have said, [illegible] the numerical information presented in the Guespolis Magna [illegible] tends to meet the assump-

tion, and so I have avoided tests of the significance of variation between means.

Application of the descriptive and inferential methods I have outlined here must be preceded by a period of caution. The terms and charts I have used in the first part to describe numerical information presented by periodical Dionysiac Magna praeter receipts involve assumptions about the procedures from which these receipts were taken. That is not the case with the tests used in the second part to assess the significance of differences between means drawn from different groups of these receipts. These tests are rather based on the assumption that the published receipts of any various groups are fair samples of the larger population. I am not certain that this is true.

In the physical and behavioral sciences, for which the science of statistics has chiefly been developed, the sets of observations used in statistical tests are usually drawn from large and available populations. In that case, the selection of sample observations can be made at random, as to ensure the independence of random samples, or, in special cases, further safeguards can be taken and other precautions with the earlier observations. In the case of the Dionysiac Magna praeter receipts, however, the situation is quite different. I have no way of knowing whether the Dionysiac receipts I have considered are representative of all those produced in modern conditions. I have no way of knowing even whether the surviving receipts are a fair sample of all those produced in modern conditions. And I am not able to gather another sample of the ancient receipts, so that I can check the statistically significant results I have found.

In order to avoid tedious repetition and repetitive qualifications throughout the second part, I'm asking the reader now and for all time that the results obtained in all the tests used to compare and analyze information presented in two or more Dionysiac receipt groups are valid only if these receipts are in fact samples of the larger number of them that were issued in Dionysia. Thus, I have no more to say remarks or disclaimers in other methods. If a particular information presented in ancient documents is to be analyzed at all, it must be analyzed statistically or else impressionistically – and the latter is hardly a more satisfactory method.

# PART I
# THE EVIDENCE

## Group Offer: Meetings with Mr. Tax Planner

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| [illegible] | | |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] |
| [illegible] | [illegible] | [illegible] |

### [illegible]

[illegible]

### [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

2. Countersignatures (Angular Cage and Equipoising).

[illegible]

II. Signature Entered Demerits, Subsequent and Countersignature Equipoising.

[illegible]

III. Signature of [illegible] Form — Approximation.

[illegible]

IV. Signature [illegible] Countersignature.

[illegible]

V. Signature Omitted: Cover Countersignatures.

[illegible]

VI. Signature Accepting Countersignature Demerits.

[illegible]

Appendix of Charts.

Attacks of Wheat Cutting Tree.

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | |

Attacks of Wheat Cover Tree.

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Artabs of Barley

[illegible]

[illegible]

[illegible]

Artabs of [illegible]

[illegible]

Amount of Payment Lost

[illegible]

[illegible]

## Central Tendencies

Wheat for Current Taxes: Mean size of payment [illegible] artabs; median size of payment [illegible] artabs.

Wheat for Past Taxes: Mean size of payment [illegible] artabs; median size of payment [illegible] artabs.

Barley: Mean size of payment [illegible] artabs; median size of payment [illegible] artabs.

## Season of Payment

Wheat for the tax of the current year:

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Wheat for the tax of a previous year:

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

---

[illegible]

Dealers for the sale of the current year:

[illegible]

Date of payment [illegible]

[illegible]

[illegible]

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

**[illegible]**

[illegible]

## Group Two: Receipts for Payments [illegible]

[illegible]

[illegible]

[

c. Countersignature Application.

(1) [illegible]

(2) [illegible]

(3) [illegible]

(4) [illegible]

d. Countersignature Application and Disposition.

[illegible]

III. Signature Application.

a. Countersignature Disposition and Application.

[illegible]

b. Countersignature Disposition.

[illegible]

IV. Signature Control Countersignature Limits.

[illegible]

V. Signature [illegible]

a. Countersignature Disposition and Application.

[illegible]

b. [illegible]

[illegible]

c. Countersignature Application.

[illegible]

d. Countersignature Disposition.

[illegible]

e. Countersignature Application.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

17. [illegible]

18. [illegible]

19. [illegible]

20. [illegible]

21. [illegible]

VI. Signature: Πτολεμαίος αἰτοῦσι.

a. No Countersignature

[illegible]

b. Countersignature: Ὑπερείδης

[illegible]

VII. Signature: Ἀλεξανδρεύς; 1. No Countersignature

[illegible]

VIII. Signature: Ἀλεξανδρεύς; No Countersignature

[illegible]

IX. Signature: Ἀπολλώνιος

a. No Countersignature

[illegible]

b. Countersignature: Ἀστυφίλος

[illegible]

X. Signature: [illegible]; No Countersignature

[illegible]

XI. Signature: illegible; No Countersignature

[illegible]

## Amount of Disposable

Ἀτοῦς of Wheat: Current Year

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible] Indeed! [illegible] bears the signature "[illegible]." Not notes that [illegible] towards Ἀλεξανδρεύς.

[illegible] signature supplied by [illegible] [illegible] throughout.

[illegible] The line of [illegible] suggests that the [illegible] was that of Ἀπολλώνιος.

[illegible] Signature supplied by [illegible]

[illegible]

Amount of Wheat [illegible]

Amount of Barley

Amount of Payment [illegible]

[illegible]

Wheat for the year of the [illegible]

[illegible]

[illegible]

Above is the raw [illegible]

[illegible]

Barcey for the raw of [illegible] year

[illegible]

Date of receipt lost

[illegible] 1492

[illegible] 1493

**Taspavera**

Greek Names

[illegible]

Egyptian Names

[illegible]

[illegible] – O. [illegible]
[illegible] – O. Bodl. [illegible]
[illegible] – O. Bodl. [illegible]
[illegible] – O. [illegible]
[illegible] – O. Bodl. [illegible]

Semitic Names
[illegible] – O. Bodl. [illegible]
[illegible] – O. [illegible]

Mixed Names
[illegible] – O. Bodl. [illegible]
[illegible] καὶ [illegible] – O. Bodl. [illegible]

## Group Three: Receipts for Payments
## [illegible]

O. Bodl. [illegible]
O. Bodl. [illegible]
O. Bodl. 151
O. Bodl. [illegible]
O. Bodl. [illegible]
O. Bodl. [illegible]

O. Bodl. [illegible]
O. Bodl. [illegible]
O. Bodl. 274
O. Bodl. [illegible]
O. Bodl. [illegible]
O. Bodl. 278

[illegible]
[illegible]
[illegible]
[illegible]

### Formula

[illegible]

### Signature Groups

I. Signature [illegible]
  1. [illegible]
    O. Bodl. [illegible]
    O. Bodl. [illegible]
    [illegible]
  2. [illegible]
    O. Bodl. [illegible]
II. Signature [illegible]
    O. Bodl. [illegible]

III. Signature Tokens: No Countersignature [illegible]

(a) Rule [illegible]

(b) Rule [illegible]

IV. Signature as Form of Countersignature: Exceptions [illegible]

(a) Rule [illegible]

(b) [illegible]

(c) Rule [illegible]

V. Signature Dishonoring Invalidates Countersignature Dependency

(a) Rule [illegible]

(b) [illegible]

(c) [illegible]

VI. Signature Dishonoring, No Countersignature

(a) Rule [illegible]

VII. Signature Dishonored, No Countersignature [illegible]

(a) Rule [illegible]

(b) Rule [illegible]

## Appendix: Provisions

Articles of Wheat Current Law

[illegible]

Articles of Wheat Law Law

[illegible]

[illegible]

Arrabs of Barley:

[illegible] 12 - 0 *Bind* [illegible]

Arrabs of Clarion:

[illegible] - 0 *Bind* [illegible]

Amount Lost:

0 *Bind* [illegible]

## Central Treasurers

Wheat for Current Taxes. Mean size of payment 20 40 arrabs, median size of payment 54 8 12 arrabs

## Season of Payments

Wheat for the tax of the current year

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] June [illegible] *Bind* [illegible]

[illegible] July [illegible] *Bind* [illegible]

[illegible] August [illegible] *Bind* [illegible]

[illegible] August [illegible] *Bind* [illegible]

[illegible] August [illegible]

[illegible] September [illegible]

[illegible] September [illegible] *Bind* [illegible]

Wheat for the tax of a previous year

[illegible] January [illegible] *Bind* [illegible]

Barley for the tax of the current year.

[illegible] July [illegible] *Bind* [illegible]

Clarion for the tax of a previous year

[illegible] November [illegible] *Bind* [illegible]

Date of payment lost.

[illegible]

## Taxpayers

Greek Names:

[illegible] *Bind* [illegible]

[illegible] *Bind* [illegible]

[illegible] *Bind* [illegible]

[illegible] *Bind* [illegible]

[illegible]

Employer Name:

[illegible]

Employee Name:

[illegible]

Group Level Principal Tax Return for Non-Resident Aliens

| [illegible] | [illegible] |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

[illegible] Name of Taxpayer [illegible] Kind and Amount of Payment [illegible] Kind and Amount of Payment [illegible]

Signature Group

I. Signature [illegible]

[illegible] Taxpayer's name [illegible]

II. Signature Application

A. [illegible]

[illegible]

[illegible] Taxpayer [illegible]

[illegible]

[illegible]

b. Countersignature Indication

[illegible] Tax-phrase before tax-year. [illegible]

c. Countersignature Availability

[illegible]

d. Countersignatures: Indication and Equivalency

[illegible]

e. Countersignature Equivalency

[illegible]

III. Signature Omitted: Countersignatures Available and Acknowledgments

[illegible]

## Amount of Payment

Amounts of Wheat: Current Tax

[illegible]

Amounts of Wheat: Back Tax

[illegible]

Amounts of Barley

[illegible]

Amounts of Oats

[illegible]

Amount Lower

[illegible]

## General Tendencies

Wheat for current taxes: Most usual amount of payment [illegible] amounts; Indian seed payment [illegible] amounts

## Season of Payment

Wheat for the tax of the current year

[illegible]

Wheat for the tax of a previous year

[illegible]

[illegible] For the tax, see note 25 above.

[illegible] Compare [illegible] above. For the tax, see note 25 above.

[illegible] [illegible] taxpayer's name read by Wickers. Charge. For the tax, see note [illegible] above.

[illegible] "Omitted" reported by Tax and Wetzel. [illegible] original reading [illegible]

Rules for the tax of the current year

[illegible]

Person for the taxpayer's current year

[illegible]

Date of payment form

[illegible]

## Taxpayers

Check Number

[illegible]

Taxpayer's name

[illegible]

Spouse's name

[illegible]

## [illegible]

| [illegible] | [illegible] |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

## [illegible]

Taxpayer's Month [illegible] Taxpayer's Name and Amount of Payment. Signature

## Signature [illegible]

1. Signature: According, Non-[illegible] signature.

   [illegible]

   [illegible] Taxpayer's [illegible]

(4) [illegible] signature [illegible] signature [illegible] 21 [illegible] 1986.

[illegible] Tax-phase alternator-[illegible]

II. Signature [illegible] Non-[illegible] signature

[illegible]

III. Signature [illegible] Non-[illegible] signature

[illegible]

## Amount of Payment

Attach at Whole Current Tax

[illegible]

Attach at Bottom

[illegible]

## [illegible]

[illegible]

## [illegible]

[illegible]

## Tax [illegible]

Check Number

[illegible]

[illegible]

[illegible]

[illegible]

## [illegible]

[illegible]

[illegible]

[

## [illegible]

When for the [illegible] of the current year

[illegible]

[illegible]

## [illegible]

Stock Notices

[illegible]

[illegible]

## [illegible]

[illegible]

## Formula

[illegible]

## [illegible]

I. [illegible]

[illegible]

II. [illegible]

[illegible]

III. [illegible]

[illegible]

[illegible]

[illegible]

[illegible] Signature Omitted, [illegible]
[illegible]
[illegible]

## Amount of Payment

Arrears of Three Annual Tax
[illegible]
[illegible]
[illegible]
[illegible]

Arrears of Three Land Tax
[illegible]

Amount of Payment Due
[illegible]

## Criminal Sentences

Where for Crimes [illegible] payment [illegible] payment [illegible]

## Sequestrations

Three for the rent of the current year
[illegible]

Where for the rent of a previous year
[illegible]

Date of payment fixed
[illegible] first payment

## Taxpayers

Greek Names:
[illegible]

Names Lost:
P.Col. 1440
O. Bod. 167

### Group Eight: Payments of [illegible] and [illegible]

| | | |
|---|---|---|
| O. Bod. 166 | O. Bod. 176 | O. Strassb. 416 |
| O. Bod. 167 | O. Bod. 181 | O. Strassb. 419 |
| O. Bod. 168 | O. Bod. 187 | O. Strassb. 420 |
| O. Bod. 170 | | WO 1360 |
| O. Bod. 171 | O. Leiden 31 | WO 1362 |
| O. Bod. 173 | | WO 1367 |
| O. Bod. 174 | P.Col. 1445 | WO 1361 |
| O. Bod. 175 | | WO 1371 |

Formula

[illegible]
[illegible]

[illegible]
[illegible]
[illegible]

Signature Groups

I. Signature [illegible], No Countersignature.
O. Bod. 170
O. Bod. 171
II. Signature in Form of Countersignature: [illegible]
O. Bod. 173
O. Leiden 31
O. Bod. 176
III. Signature [illegible] Countersignature [illegible].
O. Bod. 166
IV. Signature [illegible], No Countersignature.
O. Bod. 167
V. Signature [illegible].
A. Countersignatures [illegible] and [illegible].
O. Bod. 168
O. Bod. 175
WO 1367

[illegible]

## [illegible] Tendencies

Patterns of About Mean [illegible]

### Seasonal Patterns

Mean for the [illegible] of the [illegible] year

- [illegible]

Mean for the [illegible]

- [illegible]

Patterns for the [illegible]

- [illegible]

Patterns for the [illegible]

- [illegible]

## Tarpaulin

Lovely Summer

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

[illegible]

Egyptian Names

[illegible]

Mixed Names

[illegible]

Names Lost

[illegible]

Payments of [illegible] were [illegible] the same [illegible] [illegible] are [illegible] [illegible] Schedule [illegible] [illegible] here recorded have been [illegible] [illegible]

[illegible] study these [illegible] hand, and the fact that [illegible] different from those [illegible] reason [illegible] these payments [illegible] separately rather than [illegible] with the [illegible] payments of other kinds in the next part of this [illegible]

The superscript [illegible] does not appear in any Diospolis Magna receipt dated earlier than [illegible] considering the large number of published receipts that are dated [illegible] the [illegible] certain that the failure of the superscript to appear at an earlier date [illegible] case. Either the superscript [illegible] payment [illegible] the [illegible] or [illegible] was paid earlier, it was not paid to the local granary [illegible] the word [illegible] indicates, for instance, that the grain was to be transported to the temples, it may originally have been taken to [illegible] or, if it was paid at the granary, it was not recorded in receipt.

The [illegible] superscript appears on about [illegible] per cent [illegible] of the Diospolis Magna receipts here studied. All the subgroups but Four, Five and Seven include receipts on which the superscript appears; the total numbers of receipts assigned to these three groups are eight, seven and eight, respectively.

[illegible]

[illegible]

[illegible]

[illegible]

# PART II
# DISCUSSION

## SECTION VII—GRANT REVOLVER FILES

[illegible]

[illegible]

[illegible]

Documents from the [illegible] of the second century are [illegible] upon the information they supply [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] commonly countersigns receipts in [illegible] and [illegible] countersignature [illegible] can be identified with Peterson and Carl's Black's [illegible] The [illegible] number 2[illegible] which he, [illegible] in the year [illegible] 1[illegible], then we may suppose that the [illegible] commonly countersigned receipts. Without pretendings which are of [illegible] both [illegible] and [illegible] signatures of receipts, we cannot tell whether [illegible] other [illegible] identification [illegible]

Signatures, Dates of Documents, Tax-phrase Groups

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| [illegible] | [illegible] | | | | | | |
| [illegible] | | [illegible] | [illegible] | | | | [illegible] |
| [illegible] | | [illegible] | [illegible] | | | | [illegible] |
| [illegible] | | [illegible] | | | | | [illegible] |
| [illegible] | [illegible] | [illegible] | | | | | |
| [illegible] | | [illegible] | | | | | |
| [illegible] | | [illegible] | | | | | |
| [illegible] | | [illegible] | | | | | |
| [illegible] | | [illegible] | | | | | |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| B. Average | [illegible] | | | | | | |
| C. No signature | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

[illegible]

| | | | | |
|---|---|---|---|---|
| [illegible] | | [illegible] | | |
| [illegible] | | [illegible] | | |
| [illegible] | | [illegible] | | |
| [illegible] | | | | |
| [illegible] | [illegible] | | | |
| [illegible] | [illegible] | | | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] |
| [illegible] | | [illegible] | | [illegible] |

| | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|
| 9 Analysis and Technology | | [illegible] | | [illegible] | | | |
| 10 [illegible] | [illegible] | | | [illegible] | | | |
| 11 [illegible] | | | | [illegible] | | | |
| 12 [illegible] | | [illegible] | | | | | |
| 13 [illegible] | | [illegible] | | | | | |
| 14 [illegible] | | | | | | | [illegible] |
| 15 [illegible] | | [illegible] | | | | | |
| 16 [illegible] | | [illegible] | | | | | |
| 17 [illegible] | | [illegible] | [illegible] | | | | |
| 18 [illegible] | | [illegible] | | | | | |
| 19 [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

[illegible]

## [illegible] FORMULA

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

6. Signature: Commonly the name [illegible] Hermes and Asclepiades [illegible] [illegible] a countersignature [illegible] Name [illegible] of payment. [illegible] their names. [illegible]

[illegible] signature [illegible]

Signature [illegible]

A countersignature [illegible]

[illegible]

[illegible]

[illegible] and Apollonius [illegible]

[illegible]

[illegible] King and [illegible] the [illegible]

[illegible]

## SECTION THREE — [illegible] PAYMENT

[illegible]

[illegible]

Agreements in three crops appear in excerpts of the Dionysiaka Magna formula:

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## [illegible] OF PAYMENT

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] in the proportions of Greek [illegible] Table [illegible]

[illegible]

[illegible]

[

## Taxpayers Possibly Related

[illegible]

## SECTION SIX — THE TAXES IN GRAIN

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

and related [illegible] that is, [illegible]

[illegible] relationship between [illegible]

[illegible]

[illegible] Magna [illegible]

[illegible]

[illegible]

[illegible]

[illegible] appears only on the later Ptolemaic receipts, while [illegible] is the earlier and more frequent.

Whether either of these sorts of taxes—those described by two-phrase groups (one through [illegible] or those related to the temple) represents the *hepkata* exactly [illegible] positively, answers from remains of [illegible] land, or rather a [illegible] from holders of [illegible] "private-owned land" cannot be [illegible] from the Ptolemaic receipts [illegible] the term *hepkata* [illegible] designate the status of the persons and lands on which they fall.

[illegible] as examples of the [illegible] of the two-phrase [illegible] through [illegible] the [illegible] of [illegible] [illegible] According to Rostovtzeff [illegible]

[illegible] the two papyri in [illegible] two-phrase [illegible] Magna [illegible] [illegible] to believe that the receipts [illegible] exclusively [illegible] alone with [illegible] [illegible] Rat, as [illegible] [illegible] Magna [illegible] [illegible] in that [illegible] the [illegible] under Dionysios Magna [illegible] may have been paid by [illegible]

## THE PROPERTY TAX SUMMARY

This study was begun under the premise that there remain, among the [illegible] of surviving Ptolemaic materials, great numbers of documents that are properly [illegible] and [illegible] cannot properly be [illegible] except in the information provided by by them is [illegible] together [illegible]

The Dionysios Magna [illegible] receipts form such a group. Documents of a single kind, of a [illegible] [illegible] [illegible] one is a fair example of the kind, and [illegible] a fair impression of the limits of the variability of the group. [illegible] [illegible] information—[illegible] [illegible] of taxpayers and of [illegible] officials—whose significance can only be assessed in comparison with similar information from

[illegible] Rostovtzeff, [illegible] Ptolemaic Egypt, [illegible] Rostovtzeff, [illegible] *Histoire* [illegible] pp. 1151 ff.

41. Schwahn, *RE*, s.v. [illegible] Trans. by [illegible] and [illegible]

42. [illegible]

the other receipts. Modern notions of Ptolemaic grain taxes and their administration cannot easily be traced by information from single [illegible] but only by information from all the receipts.

A study of related documents [illegible] combines two sorts of information. It may be a basis of reference [illegible] for the identification of single documents, whether those within the study itself or others yet to be published. It further provides [illegible] basis for making [illegible] matters of Ptolemaic [illegible] suggesting [illegible] supplying [illegible] [illegible]

The information gathered in this study makes it possible [illegible] the [illegible] Diospolis Magna granary receipts with respect to their [illegible] with respect to [illegible] [illegible] determine whether the receipts [illegible] Diospolis Magna receipts [illegible] [illegible] Diospolis Magna receipts [illegible]

[illegible] may help [illegible] The palaeographic and [illegible] in Part Two, Section One [illegible] The general [illegible] of individual [illegible] in Part Two [illegible] the dates of receipts [illegible] The [illegible] between superscript [illegible] of the Diospolis Magna granary receipts [illegible] possible [illegible] what [illegible] ought to appear in a [illegible] from the superscript [illegible] of the [illegible]

Much of the material gathered in this study has of itself some historical interest. The study, for example, of the functions of the granary officials (Part Two, Section One) who appear in [illegible] the Diospolis Magna granary receipts indicates that there were several changes in the relationships of these two sorts of officials during the [illegible] years assigned to the dates of the receipts. Awareness of such [illegible] accepting such general assertions as that the writer of receipts can at all times be identified as a [illegible] or that the [illegible] must be identified as an [illegible]

The analysis of the nationalities of taxpayers' names is of some interest in supporting the general notion that nationalities were not a determining factor in the assessment of the kinds of taxes for which the Diospolis Magna granary receipts were issued; the prevalence of Greek names among the taxpayers named

on these receipts indicates the extent to which second-century Dimpolis had been hellenized, whether generally or [illegible]. We cannot determine from the receipts themselves. The relatively large amounts of grain paid to persons whose names are Greek indicate that a large [illegible] hellenized portion of the population was economically advanced [illegible].

But the chief [illegible] of historical interest touched upon in these texts are those concerned with the number and kind of taxes paid in Ptolemaic Egypt, and the method used in that period and at that place to tax and to collect those taxes.

An analysis of the persons and [illegible] the grain taxes for which payment the Dimpolis Magna [illegible] indicates that these payments were [illegible]. These [illegible] marked [illegible] an arab and [illegible] paid for the tapes, for the tax [illegible] for the [illegible] intended [illegible] for a tax year without any [illegible]. The [illegible] substantially reduces the number of grain taxes [illegible] the [illegible] commonly [illegible] between the [illegible]. The receipts indicate that arab taxes were [illegible] than those assessed by other phrases, and that [illegible] than the others.

Scholars have [illegible] that in the Ptolemaic period government officials [illegible] from the granary [illegible] before that step was [illegible] from the threshing floor. In the [illegible] Dimpolis Magna receipts, however, we find [illegible] payments [illegible] made as early as a single year. The [illegible] of these multiple payments [illegible] in line with [illegible] which we have [illegible] made for the tapes of a single year. We may therefore suppose that some of the Dimpolis Magna receipts record the [illegible] installments toward the taxes of single years.

The dates of the Dimpolis Magna grain receipts are set out in a frequency chart arranged by the months of the Gregorian calendar. [illegible] a regular curve from March to September, with peak numbers of payment occurring in June and July. This indicates that the [illegible] being collected in the season of threshing, taxpayers' installments toward their grain taxes were delivered to the granary during the course of some six months after the harvest. Payments of grain for taxes between the beginning of the regnal year and the season of harvest almost never occur, except when they are intended to make up arrears for the taxes of the preceding year.

# INDICES

# I. PERSONAL NAMES

## A. Grandees, Officials

The letters S and A [illegible] chronological tables of signatures and countersignatures [illegible]. The dates at which each official seems to have been active [illegible] which each is referred to. [illegible] signatures [illegible] at about the same date [illegible] individual has both [illegible] probable [illegible] Pliny, the analogue [illegible] the other hand, is probably not the same person as [illegible] above p. [illegible]

## B. Other Names


[illegible]
[illegible]
[illegible]

## II. PLACE NAMES

References to Dionysius Magnus, which appear in every document in Groups One through Eight, are not cited here.

[illegible]

## III. FRAGMENTS OF THE DIONYSIUS MAGNUS FORMULA

References to [illegible] the Groups listed below as One Two, etc., in which [illegible] Each is cited separately in the tables within that Group.

[illegible]

[illegible] Hud [illegible] Three Eight!
[illegible] Hud [illegible] Three Eight, pp. [illegible], 44
[illegible] Hud [illegible] Three, Eight, p. [illegible]
[illegible] Hud [illegible] Seven
[illegible] Hud [illegible] Three
[illegible] Hud [illegible] Seven, p. [illegible]
[illegible] Hud [illegible] Two Eight, pp. [illegible], [illegible], [illegible]
[illegible] Hud [illegible] Two
[illegible] Hud [illegible] Two, p. [illegible]
[illegible] Hud [illegible] Two
[illegible] Hud [illegible] Two
[illegible] Hud [illegible] Two, p. [illegible]
[illegible] Hud [illegible] Two
[illegible] Hud [illegible] One
[illegible] Hud [illegible] One
[illegible] Hud [illegible] Two Eight
[illegible] Hud [illegible] One, pp. [illegible]
[illegible] Hud [illegible] Two, p. [illegible]
[illegible] Hud [illegible] One
[illegible] Hud [illegible] Two, p. [illegible]

[illegible] Pete [illegible] One
[illegible] Pete [illegible] Two
[illegible] Pete [illegible] One

[illegible] Quinn [illegible] One

[illegible] Sneed [illegible] Four, p. [illegible]
[illegible] Sneed [illegible] Eight
[illegible] Sneed [illegible]
[illegible] Sneed [illegible] Two Eight
[illegible] Sneed [illegible] Two
[illegible] Sneed [illegible] Four, p. [illegible]

[illegible] Thick [illegible] Five, pp. [illegible], [illegible]
[illegible] Thick [illegible] One
[illegible] Thick [illegible] Two, p. [illegible]

[illegible] Two

[illegible] Six, pp. [illegible], [illegible]
[illegible] Five, p. [illegible]
[illegible] Three
[illegible] One
[illegible] Four
[illegible] Four

[illegible] Six, pp. [illegible], [illegible]
[illegible] Two
[illegible] One, pp. [illegible], [illegible], [illegible]
[illegible] Four
[illegible] One
[illegible] Four
[illegible] Two
[illegible] Three, pp. [illegible], [illegible]
[illegible] Three, pp. [illegible], [illegible]
[illegible] Two Eight, pp. [illegible], [illegible], [illegible]
[illegible] Seven, pp. [illegible], [illegible]
[illegible] Two, p. [illegible]
[illegible] Two Eight, p. [illegible]
[illegible] Two Eight, pp. [illegible], [illegible]
[illegible] Two, p. [illegible]
[illegible] Two, pp. [illegible], [illegible], [illegible]
[illegible] Four, p. [illegible]
[illegible] Two
[illegible] One
[illegible] Two Eight, pp. [illegible], [illegible]
[illegible] Two
[illegible] One
[illegible] Four
[illegible] Seven
[illegible] One
[illegible] Two Eight
[illegible] Two
[illegible] Four, p. [illegible]
[illegible] Four, p. [illegible]
[illegible] Seven

## 2X. OTHER DOCUMENTS

[illegible] [illegible], p. [illegible]
[illegible] Speech [illegible], p. [illegible]
[illegible] [illegible], pp. [illegible]
[illegible] [illegible], pp. [illegible], [illegible]
[illegible] [illegible], [illegible], [illegible], [illegible], [illegible], [illegible], [illegible], p. [illegible]
[illegible] [illegible], p. [illegible]
[illegible] [illegible], [illegible], p. [illegible]

# V. SUBJECT INDEX

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# TABLES

TABLE 1

Numbers of Grain Tax Payments per Month, as recorded on Group One Receipts

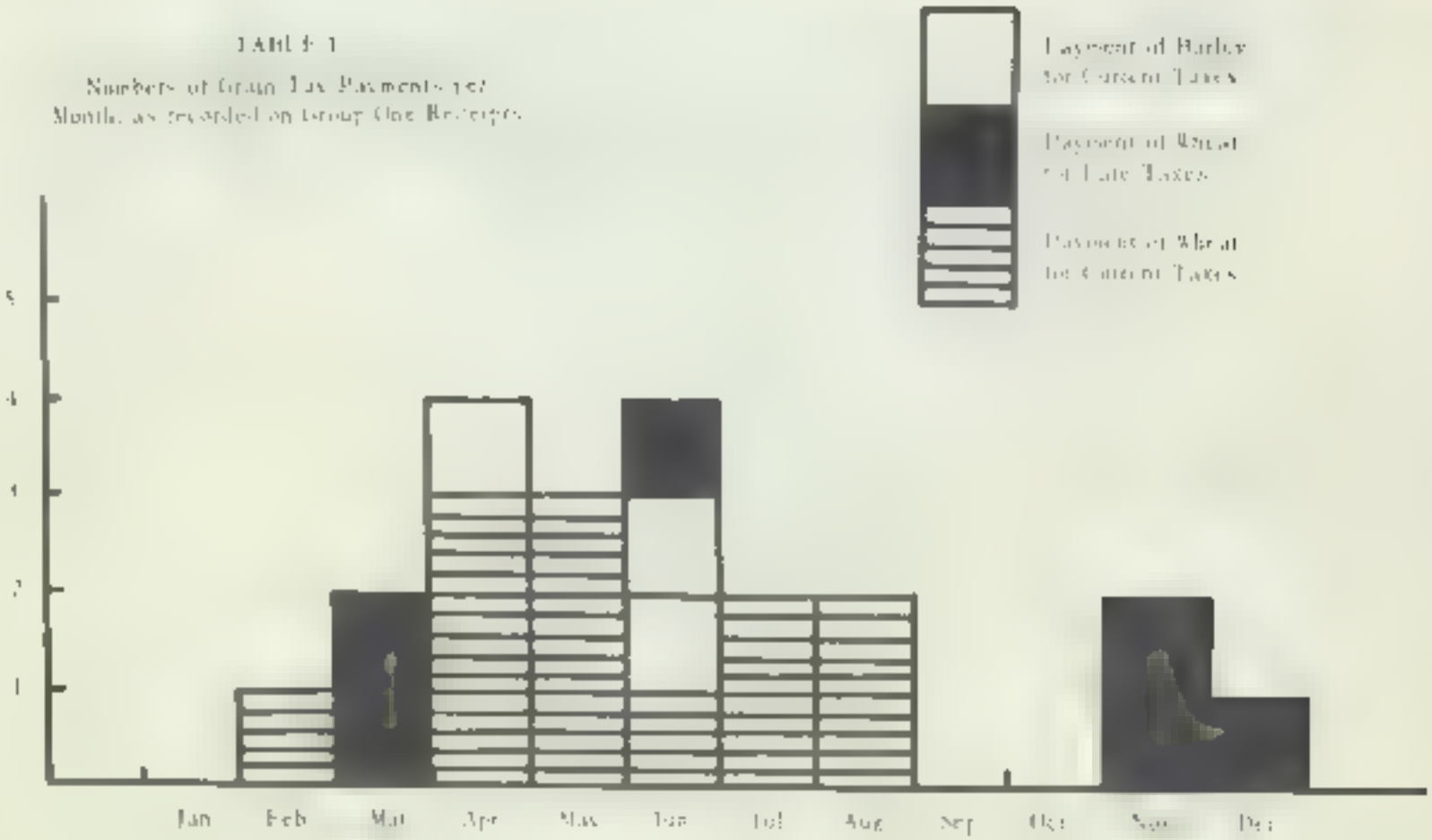
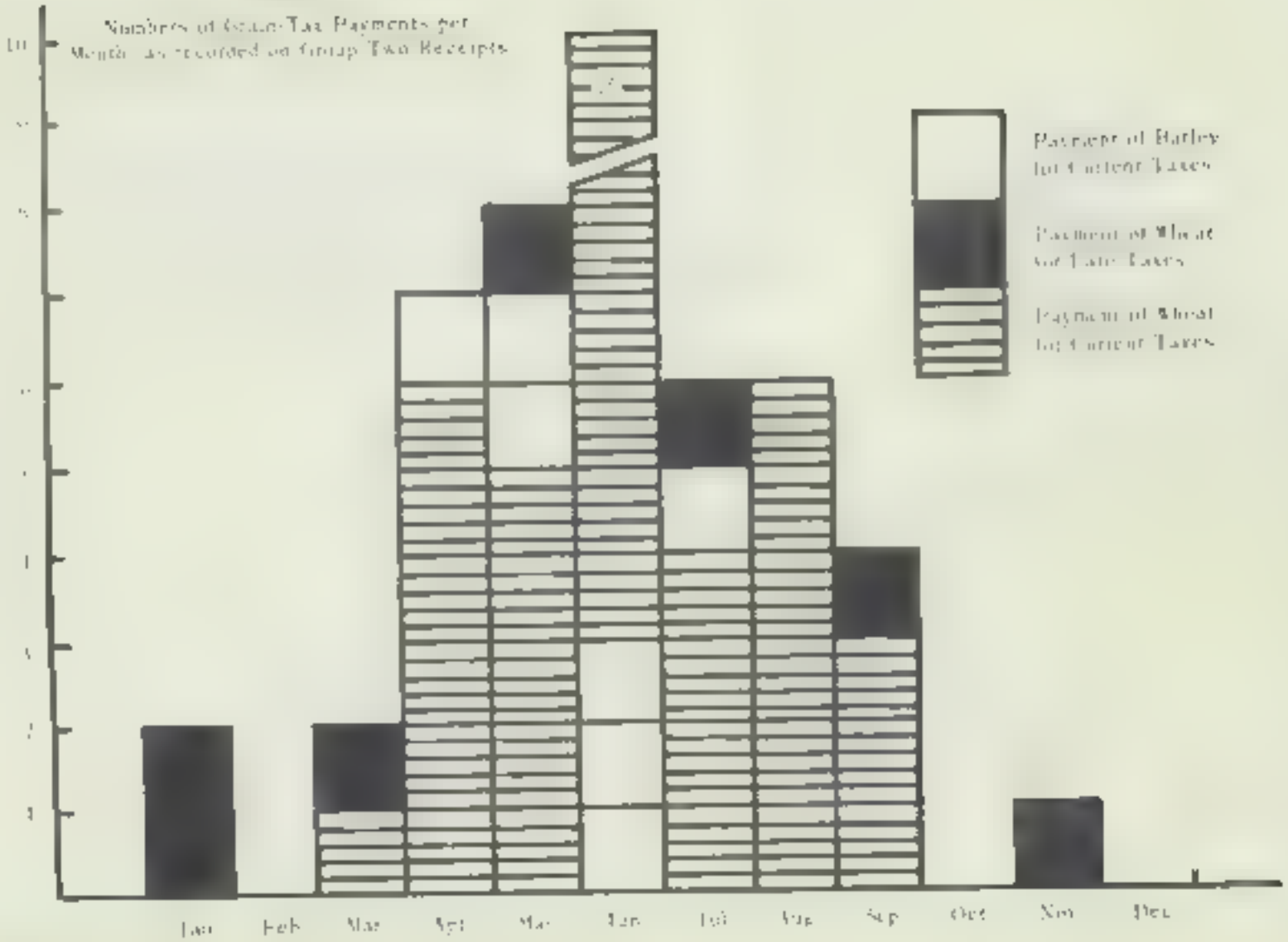


TABLE 2

Numbers of State-Tax Payments per Month as recorded on Group Two Receipts



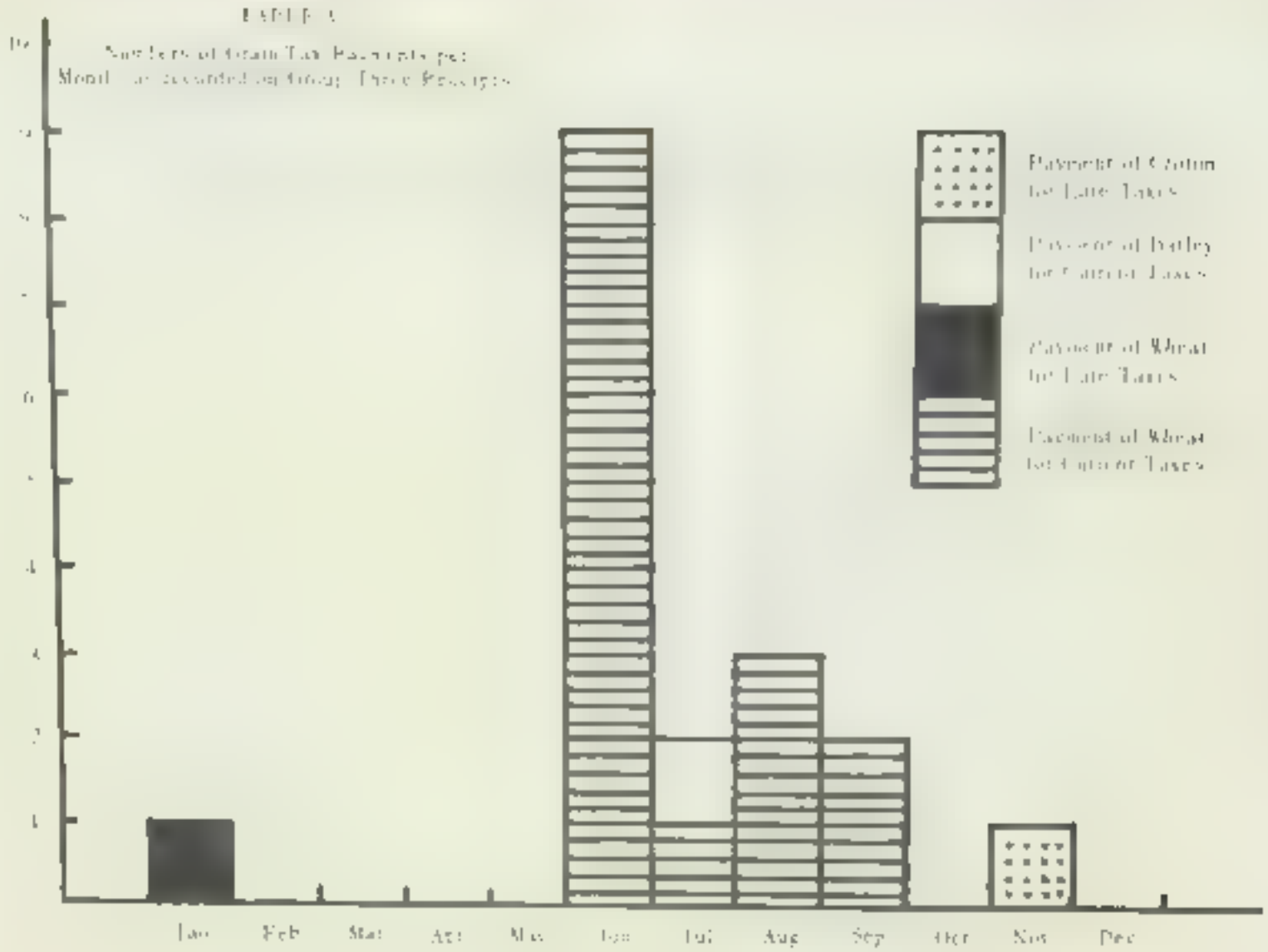

Payment of Cotton for Land Taxes
Payment of Barley for Land Taxes
Payment of Wheat for Land Taxes
Payment of Wheat for Cotton Taxes
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

TABLE 4

Numbers of Grain-Tax Payments per Month, as recorded on Group Four Receipts

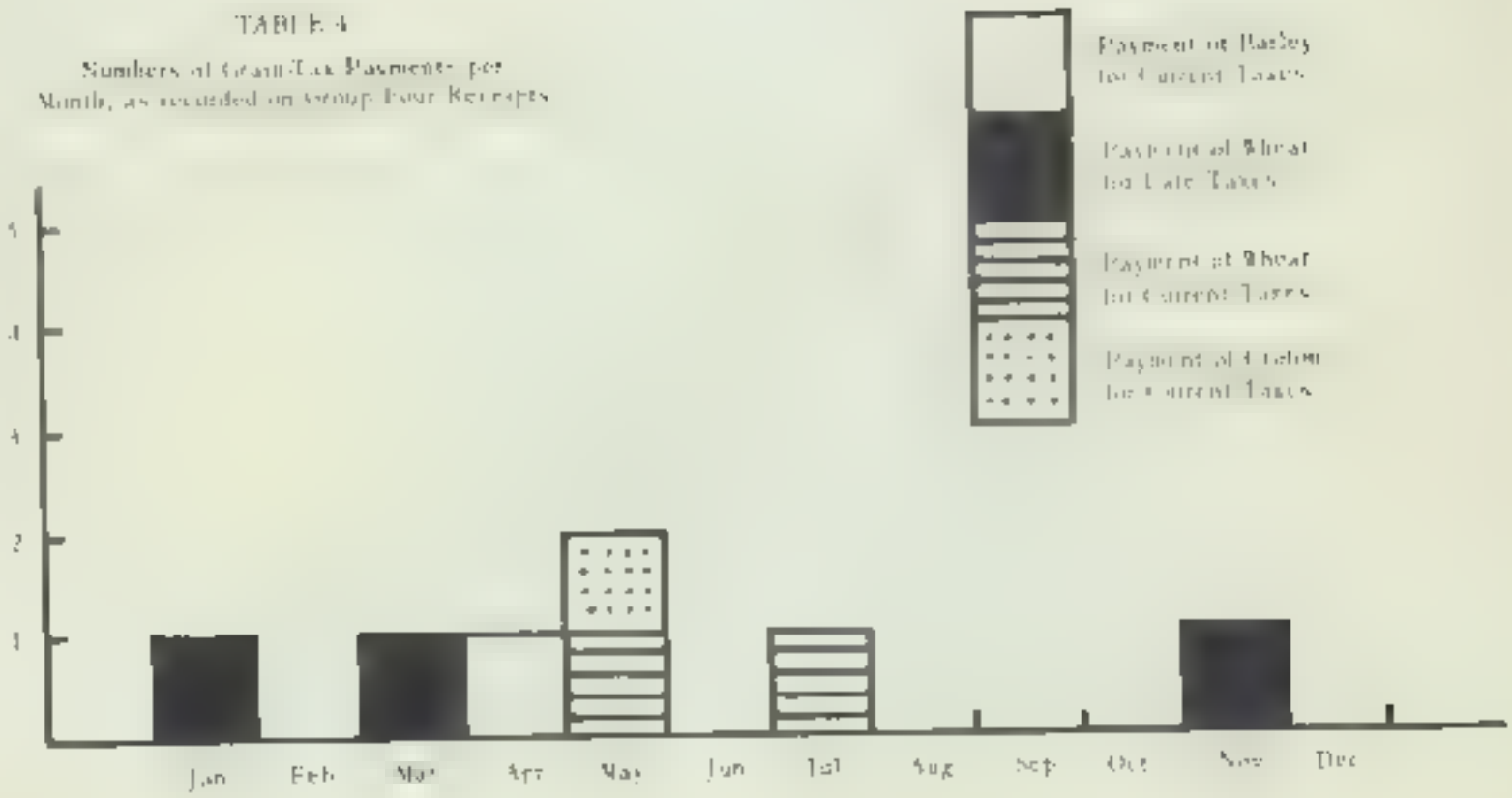


TABLE 1

Numbers of Grain Tax Payments per Month, as recorded on Group Tax Receipts

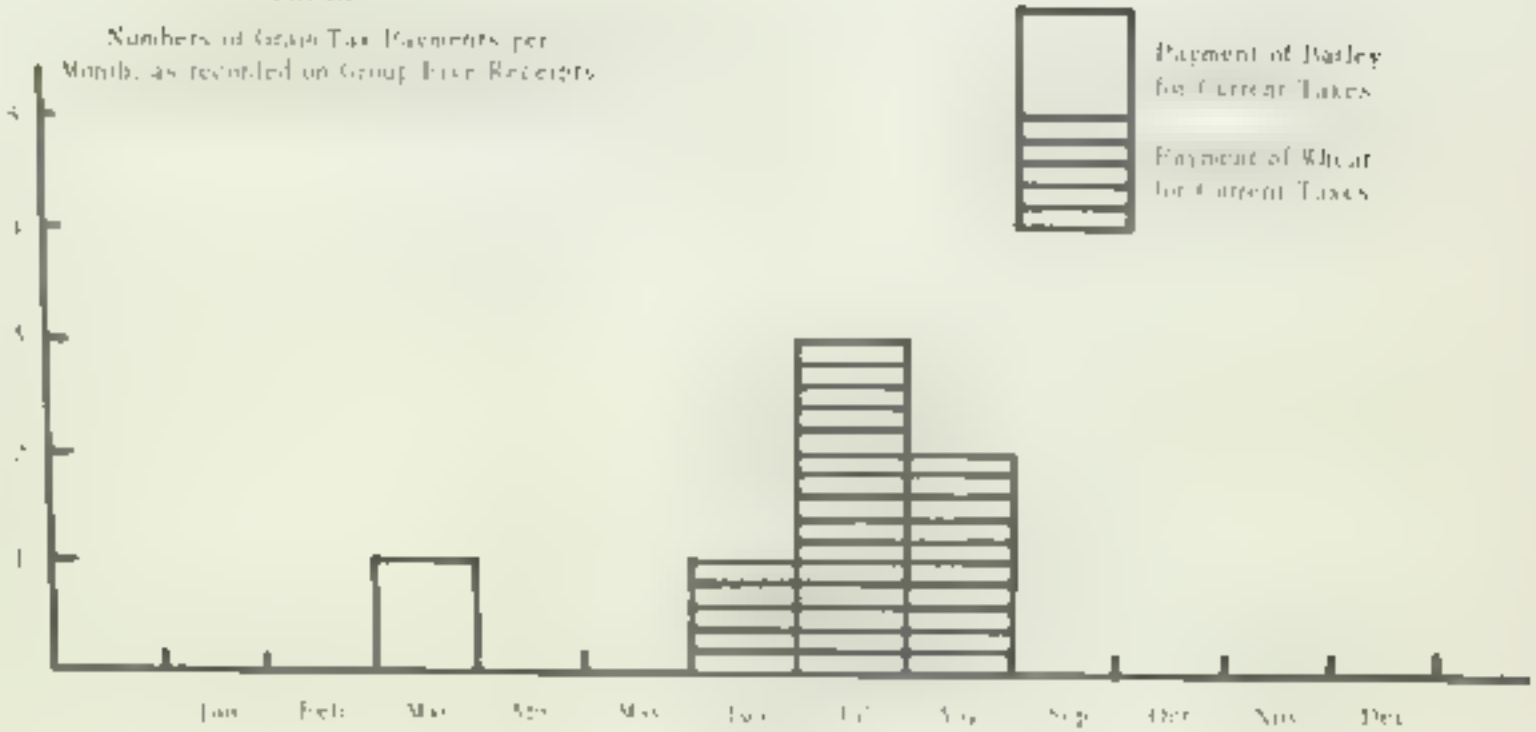
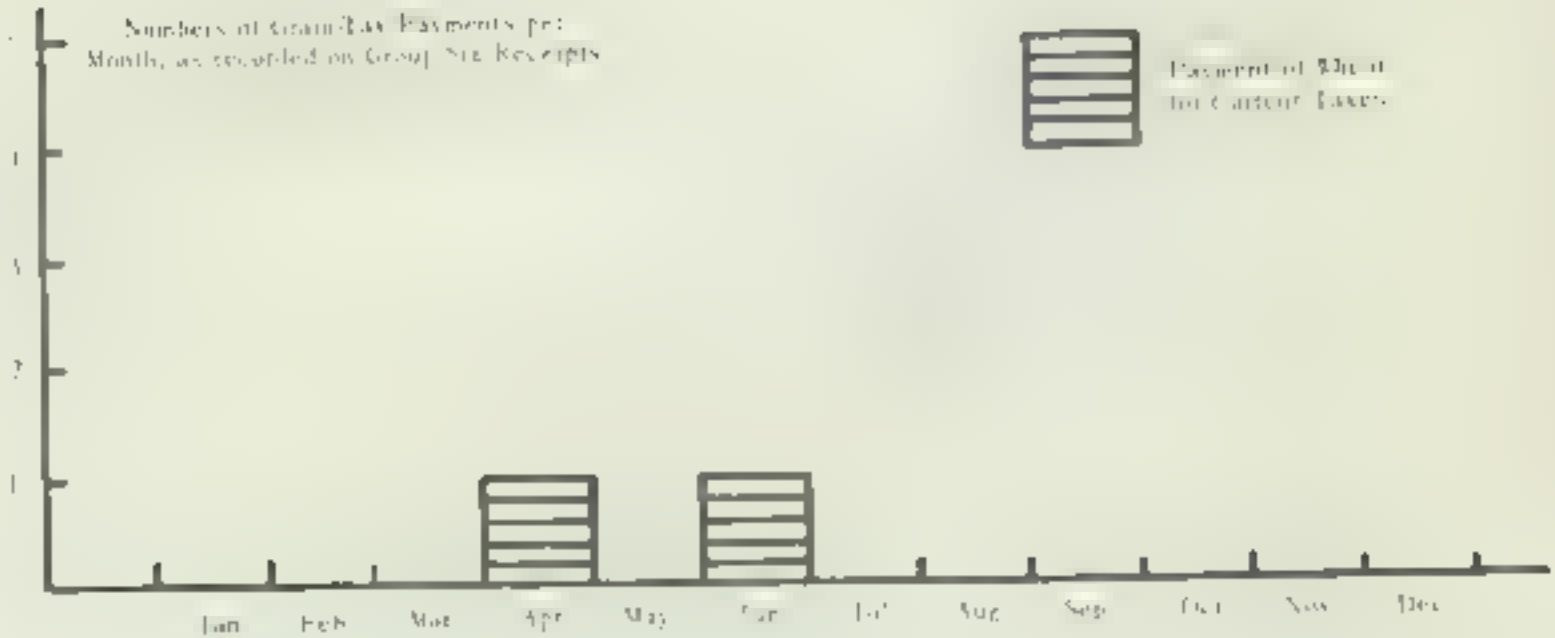
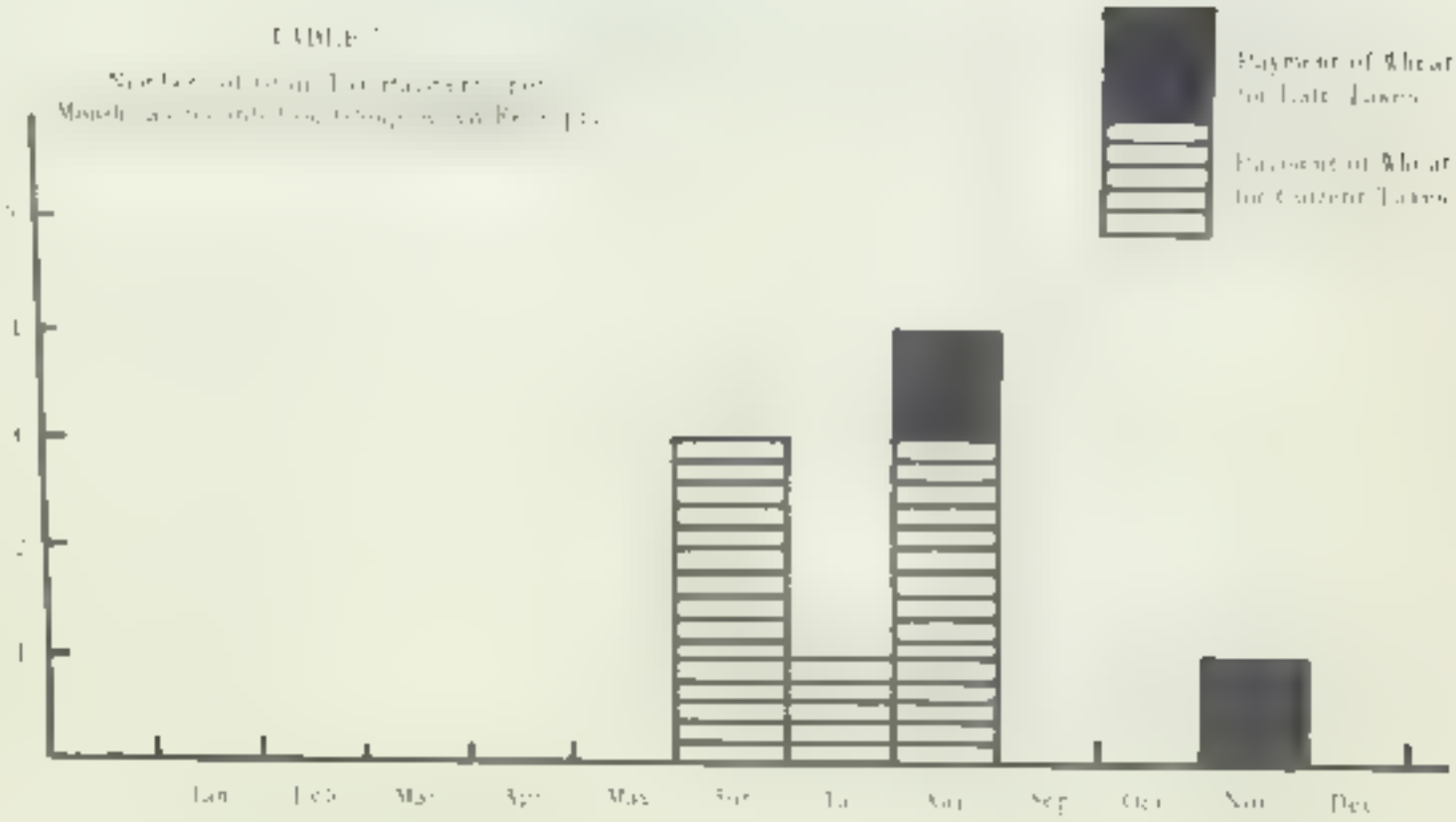


TABLE [illegible]

Numbers of Grain-Tax Payments per Month, as recorded on Group Six Receipts




Payment of Wheat
for Late Taxes
Payment of Wheat
for Current Taxes
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

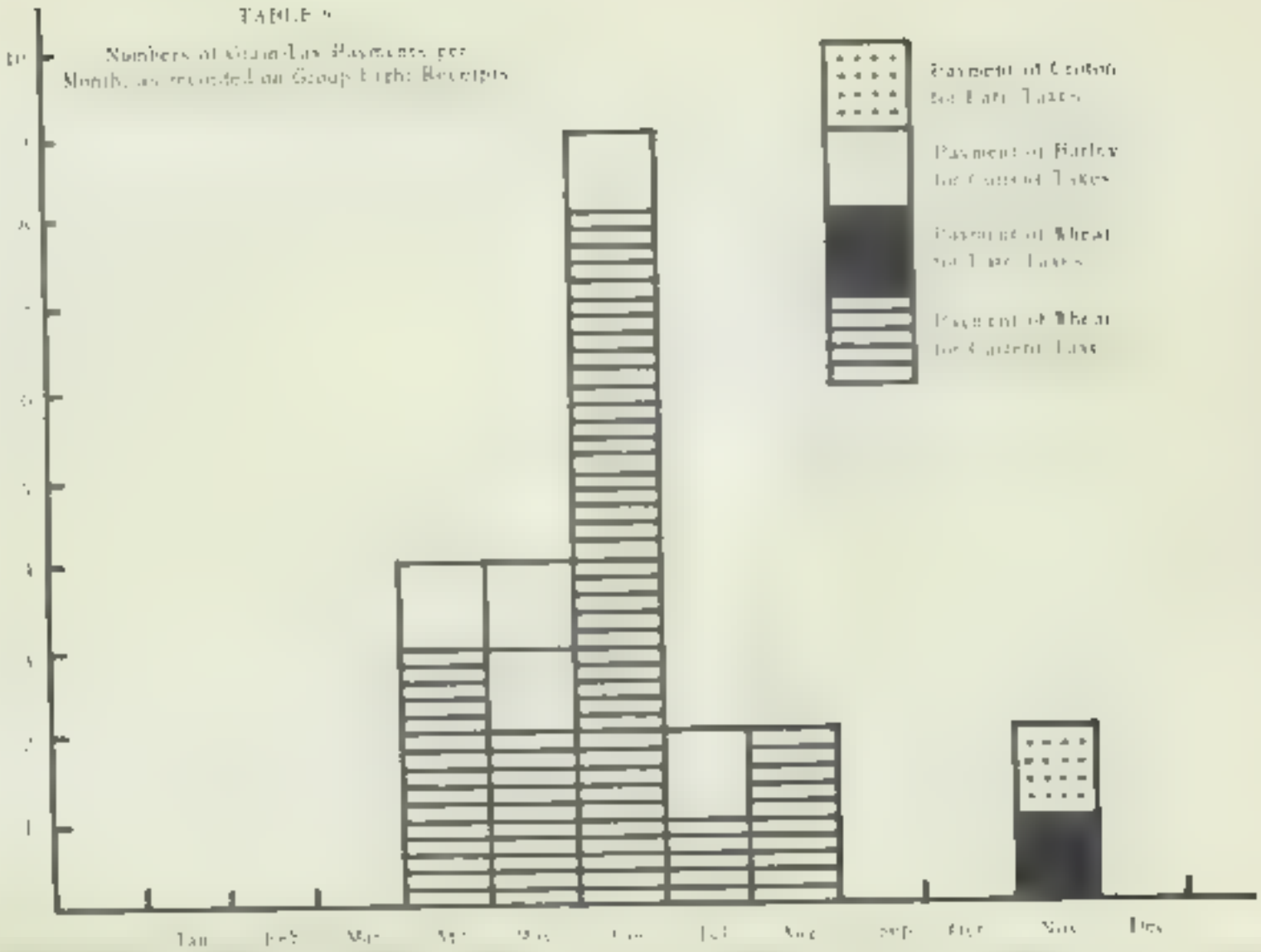


TABLE 9
Payment of Barley for Current Taxes
Payment of Wheat for Current Taxes
Nov
Dec

## TABLES

[illegible]

| [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |

| [illegible] | [illegible] |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

## [illegible]

[illegible]

| [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |

| [illegible] | [illegible] |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE 13

Chi-Square Test Statistic Table showing No Significant Difference Between Sizes of Current Payments in Barley and Wheat

| | [illegible] MEANS | [illegible] MEDIANS | TOTALS |
|---|---|---|---|
| WHEAT | [illegible] | [illegible] | [illegible] |
| BARLEY | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

TABLE 17

Chi-Square Test Statistic Significant Difference Between Sizes of Payments of Wheat [illegible]

| | [illegible] MEANS | [illegible] MEDIANS | TOTALS |
|---|---|---|---|
| CURRENT MONTH | [illegible] | [illegible] | [illegible] |
| LATE MONTH | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

TABLE 18

Size of Current Wheat Payments in the Eight Tax-Phase Groups

| | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|
| MEANS | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| MEDIANS | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

Size of Late Wheat Payments in the Eight Tax-Phase Groups

| | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|
| MEANS | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| MEDIANS | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

## TABLE 14

Kruskal-Wallis Test Showing No Significant Difference Between Current Wheat Payment Sizes of the Seven Tax-Phase Groups

| 1 | 2 | 2 | [illegible] | 4 & 5 | [illegible] | [illegible] |
|---|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

[illegible]

[illegible]

[illegible]

TABLE 15

Chi-Square Method Test Showing the Significant Difference Between Students Based on Average Marks Taken in the Various Tax-Phase Groups

| | [illegible] | [illegible] | [illegible] |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE 16

Chi-Square Method Test Showing the Significant Difference Between Students Based on Average Marks Taken in the Various [illegible]

| | [illegible] | [illegible] | [illegible] |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE [illegible]

Number and Size of Payments for Wheat and Barley

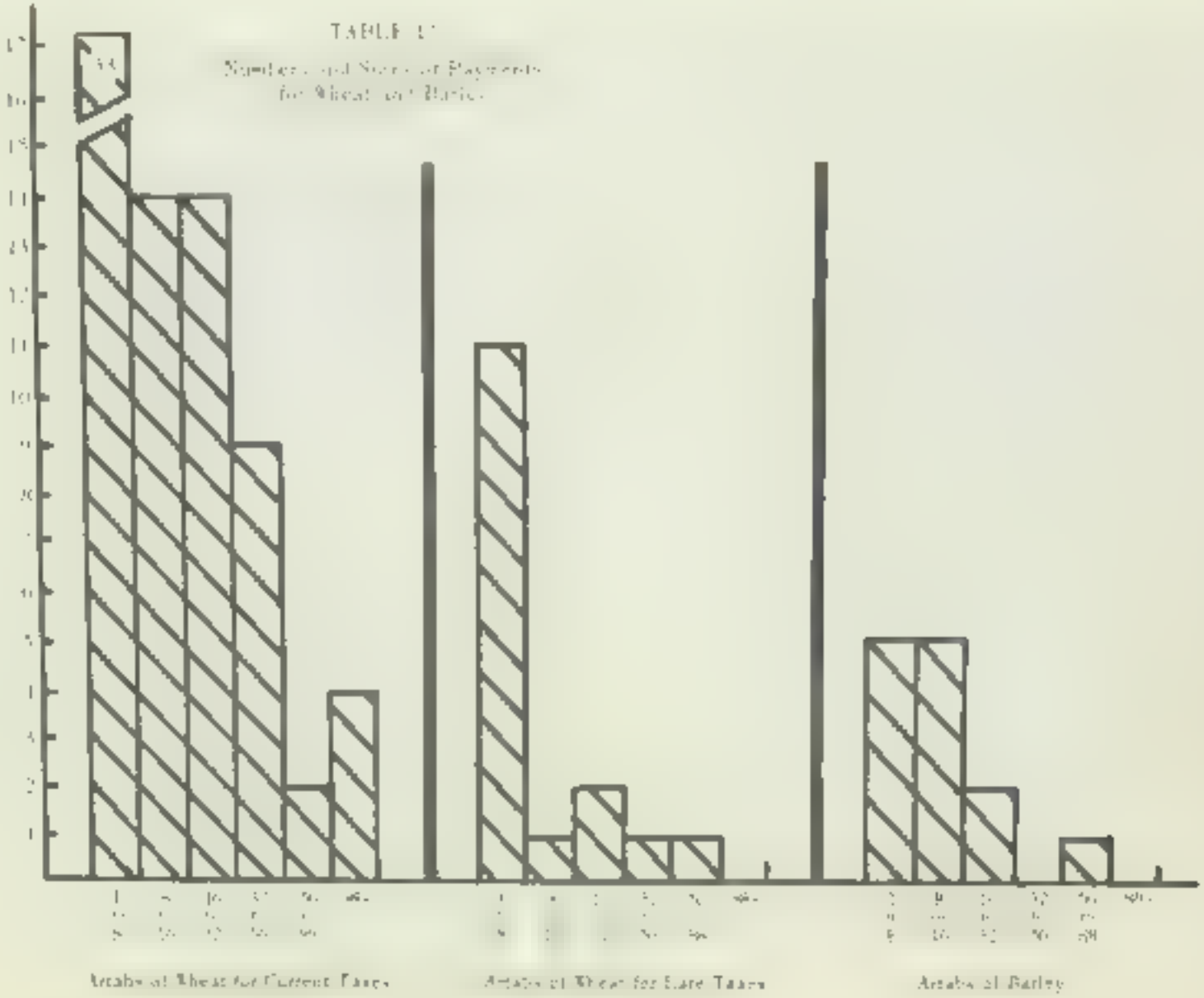


TABLE 19

Kruskal Ratio Test Showing Significant Variation Between Distributions of Dates of Payments in Various Tax-Phase Groups

| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

[illegible]

[illegible]

TABLE 20

[illegible]

| | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] | [illegible] |

| | | |
|---|---|---|
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

[illegible]

TABLE 20

Chi-Square Medians Test Showing No Significant Difference in Sizes of Payments Made in Different Seasons

| | ABOVE COMBINED MEDIAN | BELOW COMBINED MEDIAN | TOTALS |
|---|---|---|---|
| APRIL - MAY | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE [illegible]

Chi-Square Test Showing Significant Difference in Sizes of Payment During Various Seasons [illegible]

| | APRIL MAY | [illegible] | [illegible] | TOTALS |
|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | |
| [illegible] | [illegible] | [illegible] | [illegible] | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] | [illegible] |

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

[illegible]

TABLE 22

Number of Payments per Month, as recorded on All the Dungaon Magna Receipts Wheat for Current Taxes

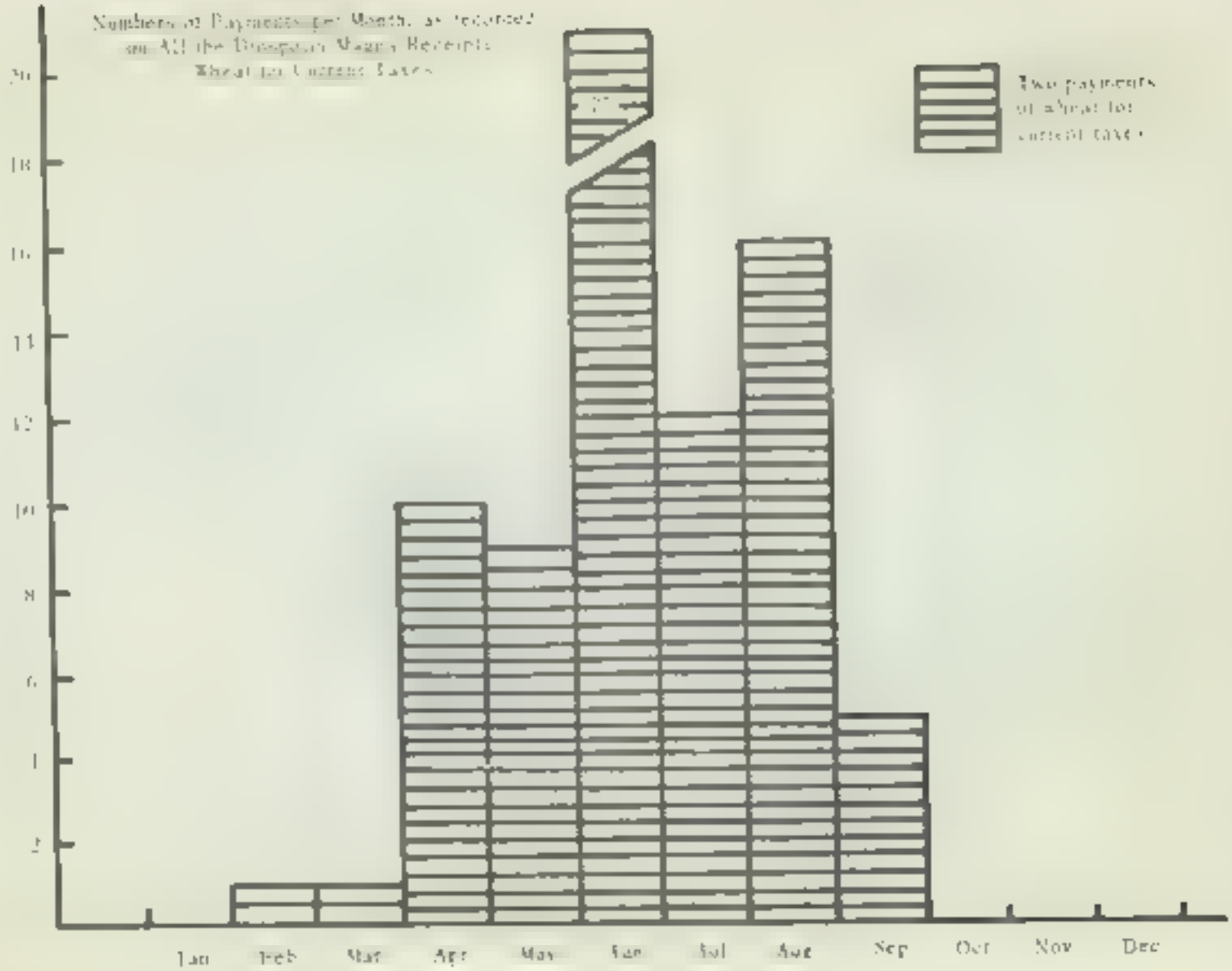


TABLE 23

Numbers of Payments per Month as recorded
on All the Tiverton Magna Receipts
Cotton and Barley for Current Taxes

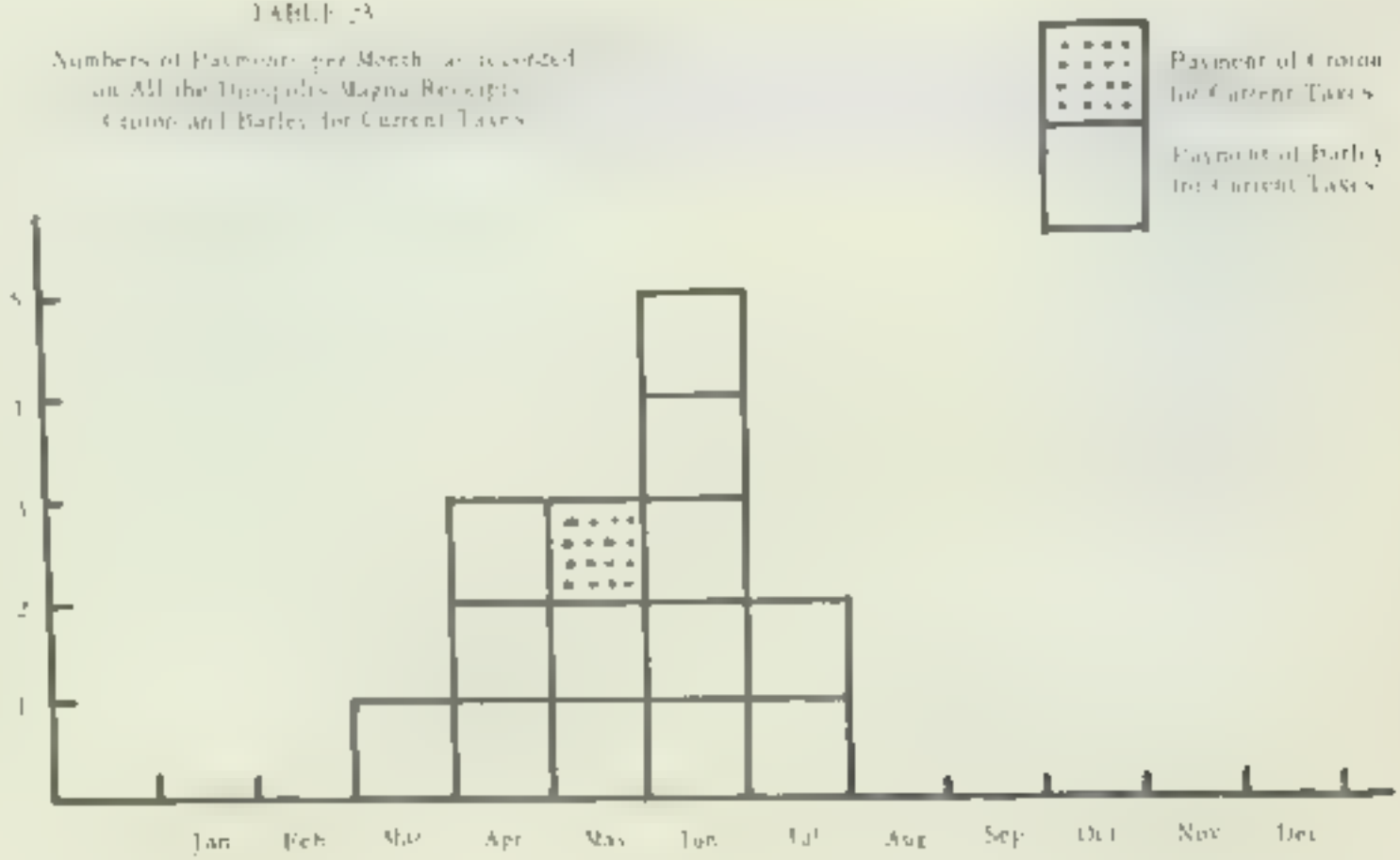


TABLE 24

Numbers of Payments per Month as recorded on All the Diospolis Magna Receipts: Wheat for Late Taxes

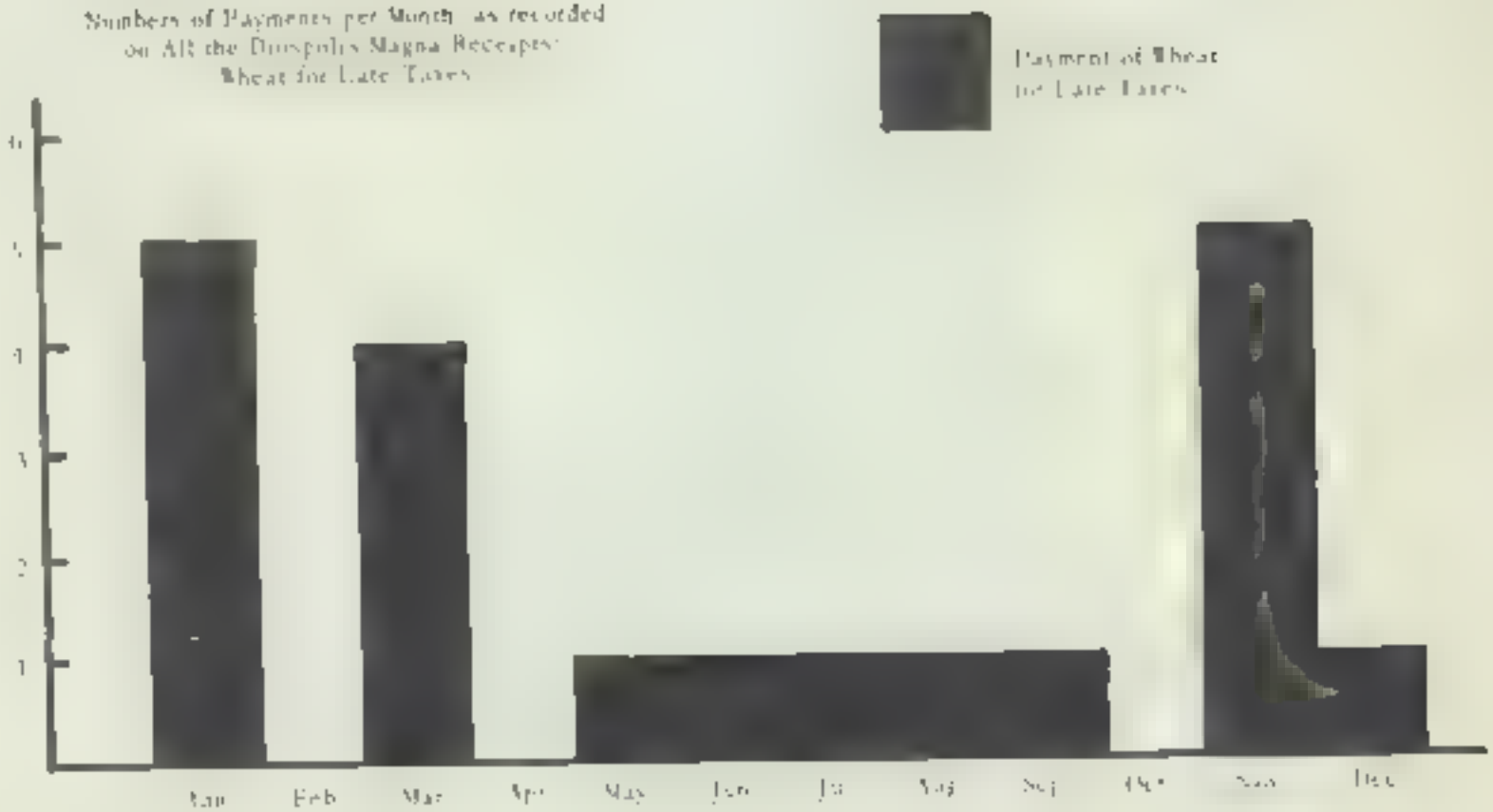


TABLE 24

Chi-Square Test Showing the Significant Difference Between Proportions of [illegible] Made by Taxpayers with [illegible]

| | [illegible] | [illegible] | TOTALS |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE [illegible]

Chi-Square Test Showing the Significant Difference Between Proportions of [illegible] Made by Taxpayers with [illegible]

| | [illegible] | [illegible] | TOTALS |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE 27

Chi Square Test Showing No Significant Difference Between Seasons of Maximum [illegible] Each Week and Other Months

| | [illegible] Season | [illegible] Season | Totals |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| Totals | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

TABLE 28

Chi Square Test Showing No Significant Difference Between Proportions of [illegible] Under Various Values of Variables in Various [illegible]

| | [illegible] Season | [illegible] Season | Totals |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| Totals | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

TABLE 24

Chi Square Test Showing No Significant Difference Between Proportions of Greek, English and other Names Among Tax Payers of Tax-Paying Occupations [illegible]

| | GREEK NAMES | ENGLISH NAMES | OTHER NAMES | TOTALS |
|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] | [illegible] |

| | | |
|---|---|---|
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

[illegible]

TABLE [illegible]

Chi Square Test Showing No Significant Difference Between Proportions of Greek, English and other Names Among Taxpayers [illegible]

| | GREEK NAMES | OTHER NAMES | TOTALS |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

TABLE [illegible]

[illegible]

[illegible]

[illegible]

TABLE [illegible]

[illegible]

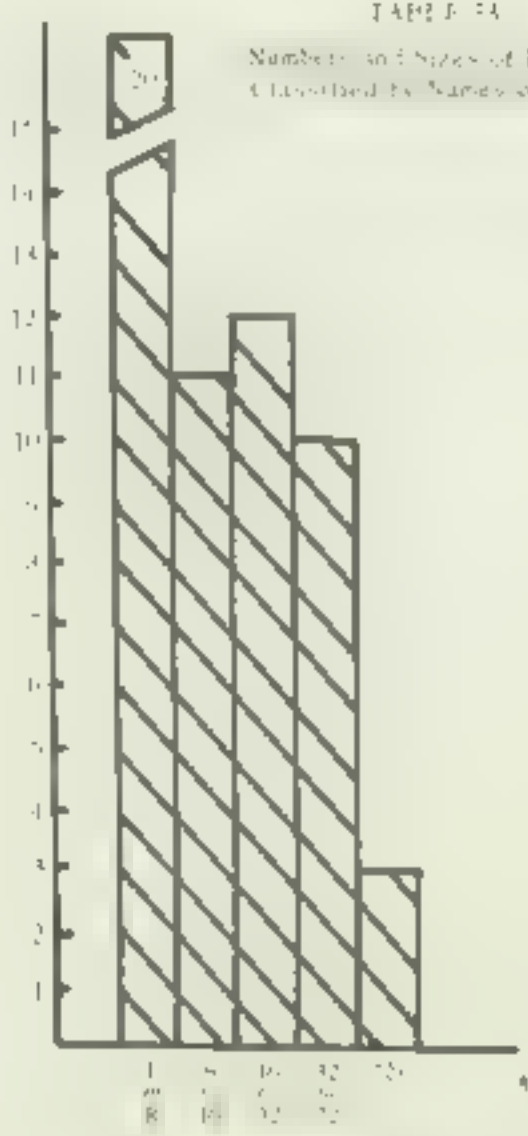
| | [illegible] | [illegible] | [illegible] |
|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] |
| TOTALS | [illegible] | [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |

[illegible]

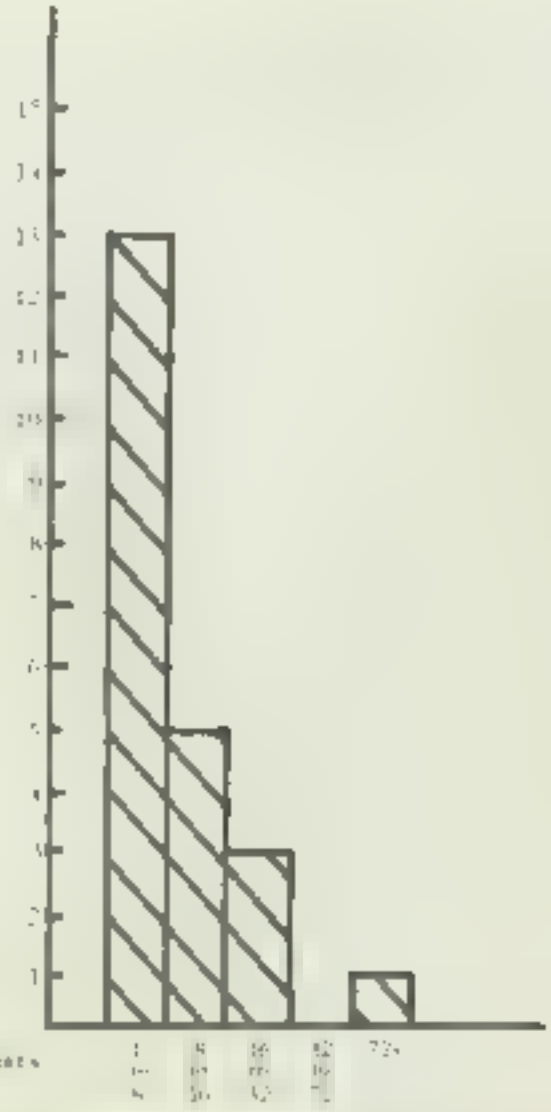
TABLE [illegible]

Number of Sizes of Payments Classified by Names of Payers



Taxpayers with Greek Names

Arrears of Wheat for Current Taxes



Taxpayers with Names of Other Sorts